

Claims:

1. A power output apparatus that outputs power to a driveshaft, said power output apparatus comprising:

5 a first internal combustion engine;

a second internal combustion engine;

a first motor;

a second motor; and

a multi-axes-type power input output mechanism that has

10 multiple axes including four axes, that is, a first axis linked to an output shaft of the first internal combustion engine, a second axis linked to an output shaft of the second internal combustion engine, a third axis linked to a rotating shaft of the first motor, and a fourth axis linked to a rotating shaft 15 of the second motor,

where one of the four axes is connected to the driveshaft, rotations of two of the four axes depend upon rotation speeds of remaining two axes of the four axes, and at least part of powers of the first internal combustion engine, the second 20 internal combustion engine, the first motor, and the second motor are output to the driveshaft with balance of powers input to and output from the multiple axes.

2. A power output apparatus in accordance with claim 1,

25 where the driveshaft is connected with either one of the third axis and the fourth axis of said multi-axes-type power input

output mechanism.

3. A power output apparatus in accordance with claim 1, where the driveshaft is connected with either one of the first 5 axis and the second axis of said multi-axes-type power input output mechanism.

4. A power output apparatus in accordance with claim 1, wherein said multi-axes-type power input output mechanism 10 comprises a first connection-disconnection mechanism that connects and disconnects the first axis with and from the output shaft of the first internal combustion engine, and a second connection-disconnection mechanism that connects and disconnects the second axis with and from the output shaft of 15 the second internal combustion engine.

5. A power output apparatus in accordance with claim 4, wherein at least one of the first connection-disconnection mechanism and the second connection-disconnection mechanism is 20 a one-way clutch.

6. A power output apparatus in accordance with claim 1, wherein said multi-axes-type power input output mechanism has the four axes arranged such that the axis connected to the 25 driveshaft is rotated at either a maximum rotation speed or a minimum rotation speed among rotation speeds of the four axes.

7. A power output apparatus in accordance with claim 1, wherein said multi-axes-type power input output mechanism has the four axes arranged such that the axis connected to the 5 driveshaft is rotated at neither a maximum rotation speed nor a minimum rotation speed among rotation speeds of the four axes.

8. A power output apparatus in accordance with claim 1, said power output apparatus further comprising:

10 a power demand setting module that sets a power demand required for the driveshaft, in response to an operator's operation; and

15 a control module that controls the first internal combustion engine, the second internal combustion engine, the first motor, the second motor, and said multi-axes-type power input output mechanism to output a power equivalent to the set power demand to the driveshaft.

9. A power output apparatus in accordance with claim 8, 20 said power output apparatus further comprising:

an accumulator unit that transmits electric power to and from the first motor and the second motor,

wherein said control module changes over a working control mode among a first control mode, a second control mode, 25 a third control mode, and a fourth control mode to output the power equivalent to the set power demand to the driveshaft,

the first control mode making control to ensure output of the power equivalent to the set power demand to the driveshaft without using the power of the first internal combustion engine but with using the power of the second internal combustion
5 engine,

the second control mode making control to ensure output of the power equivalent to the set power demand to the driveshaft without using the power of the second internal combustion engine but with using the power of the first internal combustion
10 engine,

the third control mode making control to ensure output of the power equivalent to the set power demand to the driveshaft with using the powers of both the first internal combustion engine and the second internal combustion engine,

15 the fourth control mode making control to ensure output of the power equivalent to the set power demand to the driveshaft without using neither of the powers of the first internal combustion engine and the second internal combustion engine.

20 10. A power output apparatus in accordance with claim 9, wherein said control module stops operation of the internal combustion engine, which is not used for the power output, in the first control mode or in the second control mode.

25 11. A power output apparatus in accordance with claim 9, wherein said control module selects one of the first control

mode, the second control mode, the third control mode, and the fourth control mode based on the set power demand and makes control to ensure output of the power equivalent to the set power demand to the driveshaft.

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12. A power output apparatus in accordance with claim 8, wherein said control module controls the first internal combustion engine, the second internal combustion engine, the first motor, the second motor, and said multi-axes-type power input output mechanism to ensure efficient output of the power equivalent to the set power demand to the driveshaft.

13. A power output apparatus in accordance with claim 1, wherein said multi-axes-type power input output mechanism comprises a first planetary gear unit having three rotational elements and a second planetary gear unit having three rotational elements,

where any two rotational elements of the three rotational elements in the second planetary gear unit are respectively connected with any two rotational elements of the three rotational elements in the first planetary gear unit, and

the four axes of said multi-axes-type power input output mechanism include one axis connected to a remaining rotational element of the three rotational elements of the second planetary gear unit, which is not connected with any of the three rotational elements of the first planetary gear unit, and three

axes connected to the three rotational elements of the first planetary gear unit.

14. A motor vehicle that is equipped with a power output
5 apparatus in accordance with any one of claims 1 through 13 and
has an axle linked to the driveshaft.